

(b) the nucleotide sequence of SEQ ID NO:1 from nucleotide 76 to nucleotide 2406;

(c) the nucleotide sequence of SEQ ID NO:4;

(d) the nucleotide sequence of SEQ ID NO:4 from nucleotide 1 to nucleotide 1761;

(e) the nucleotide sequence of SEQ ID NO:10;

(f) a nucleotide sequence encoding the amino acid sequence of SEQ ID NO:3;

(g) a nucleotide sequence encoding the amino acid sequence of SEQ ID NO:6; and

(h) a nucleotide sequence encoding the amino acid sequence of SEQ ID NO:11.

35. An isolated nucleic acid molecule comprising a polynucleotide that encodes a protein comprising a Semaphorin domain and that specifically hybridizes with the nucleotide sequence of SEQ ID NO:1 from nucleotide 76 to nucleotide 2406, under hybridization conditions of a buffer comprising 45%(v/v) formamide, 5x SSPE at 42°C, and washing after hybridization with a buffer comprising 2xSSPE at 42°C.

36. An isolated nucleic acid molecule comprising a polynucleotide that encodes a protein comprising a Semaphorin domain and that hybridizes with the nucleotide sequence of SEQ ID NO:7,

under hybridization conditions of a buffer comprising 45%(v/v) formamide, 5x SSPE at 42°C, and washing after hybridization with a buffer comprising 2xSSPE at 42°C.

37. An isolated nucleic acid molecule comprising a polynucleotide having a nucleotide sequence that has 80% or more sequence identity with a nucleotide sequence selected from the group consisting of:

- B
- (a) the nucleotide sequence of SEQ ID NO:1;
 - (b) the nucleotide sequence of SEQ ID NO:1 from nucleotide 76 to nucleotide 2406;
 - (c) the nucleotide sequence of SEQ ID NO:1 from nucleotide 259 to nucleotide 1776;
 - (d) a nucleotide sequence encoding the amino acid sequence of SEQ ID NO:3; and
 - (e) a nucleotide sequence encoding the amino acid sequence of SEQ ID NO:3 from amino acid 62 to amino acid 567;
- and that encodes a protein comprising a Semaphorin domain.

38. An isolated nucleic acid molecule of claim 37 comprising a polynucleotide having a nucleotide sequence that has 90% or more sequence identity with a nucleotide sequence selected from the group consisting of (a), (b), (c), (d) and (e).

39. An isolated nucleic acid molecule comprising a polynucleotide encoding an amino acid sequence that has 80% or more sequence identity with an amino acid sequence selected from the group consisting of:

(a) the amino acid sequence of SEQ ID NO:3; and

(b) the amino acid sequence of SEQ ID NO:3 from amino acid 62 to amino acid 567;
that encodes a protein comprising a Semaphorin domain.

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40. An isolated nucleic acid molecule of claim 39 comprising a polynucleotide encoding an amino acid sequence that has 90% or more sequence identity with an amino acid sequence selected from the group consisting of (a) and (b).

41. An isolated nucleic acid molecule comprising a polynucleotide that specifically hybridizes with a polynucleotide having a nucleotide sequence selected from the group consisting of:

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(a) the nucleotide sequence of SEQ ID NO:1;

(b) the nucleotide sequence of SEQ ID NO:1 from nucleotide 76 to nucleotide 2406;

(c) the nucleotide sequence of SEQ ID NO:4;

(d) the nucleotide sequence of SEQ ID NO:4 from nucleotide 1 to nucleotide 1761; and

(e) the nucleotide sequence of SEQ ID NO:10;
under conditions of a buffer comprising 45%(v/v) formamide, 5x SSPE,
at 42°C, and washing after hybridization with a buffer comprising
2xSSPE at 42°C, and that encodes a protein having the biological
activity of inhibiting neurite outgrowth from dorsal root ganglion
cells.

42. An isolated nucleic acid molecule comprising a
polynucleotide that specifically hybridizes with a polynucleotide
having a nucleotide sequence selected from the group consisting of:

- (a) the nucleotide sequence of SEQ ID NO:1;
(b) the nucleotide sequence of SEQ ID NO:1 from nucleotide 76
to nucleotide 2406;
(c) the nucleotide sequence of SEQ ID NO:4;
(d) the nucleotide sequence of SEQ ID NO:4 from nucleotide 1 to
nucleotide 1761; and

(e) the nucleotide sequence of SEQ ID NO:10;
under conditions of a buffer comprising 45%(v/v) formamide, 5x SSPE,
at 42°C, and washing after hybridization with a buffer comprising
2xSSPE, at 42°C, and that encodes a protein having the biological
activity of collapsing growth cones of retinal ganglion cells.

43. An isolated nucleic acid molecule comprising a
polynucleotide having a nucleotide sequence that has 80% or more

sequence identity with a nucleotide sequence selected from the group consisting of:

(a) the nucleotide sequence of SEQ ID NO:1;

(b) the nucleotide sequence of SEQ ID NO:1 from nucleotide 76 to nucleotide 2406;

(c) the nucleotide sequence of SEQ ID NO:1 from nucleotide 259 to nucleotide 1776;

(d) a nucleotide sequence encoding the amino acid sequence of SEQ ID NO:3; and

(e) a nucleotide sequence encoding the amino acid sequence of SEQ ID NO:3 from amino acid 62 to amino acid 567;

and that encodes a protein having the biological activity of inhibiting neurite outgrowth from dorsal root ganglion cells.


44. An isolated nucleic acid molecule of claim 43 comprising a polynucleotide having a nucleotide sequence that has 90% or more sequence identity with a nucleotide sequence selected from the group consisting of (a), (b), (c), (d) and (e).

45. An isolated nucleic acid molecule comprising a polynucleotide having a nucleotide sequence that has 80% or more sequence identity with a nucleotide sequence selected from the group consisting of:

(a) the nucleotide sequence of SEQ ID NO:1;


(b) the nucleotide sequence of SEQ ID NO:1 from nucleotide 76 to nucleotide 2406;

(c) the nucleotide sequence of SEQ ID NO:1 from nucleotide 259 to nucleotide 1776;

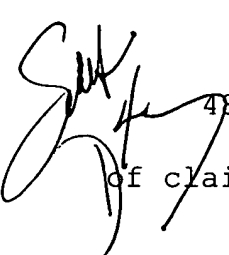
 (d) a nucleotide sequence encoding the amino acid sequence of SEQ ID NO:3; and

(e) a nucleotide sequence encoding the amino acid sequence of SEQ ID NO:3 from amino acid 62 to amino acid 567;

and that encodes a protein having the biological activity of collapsing growth cones of retinal ganglion cells.

 46. An isolated nucleic acid molecule of claim 45 comprising a polynucleotide having a nucleotide sequence that has 90% or more sequence identity with a nucleotide sequence selected from the group consisting of (a), (b), (c), (d) and (e).

47. An isolated nucleic acid molecule comprising a polynucleotide encoding a polypeptide encoded by the cDNA contained in FERM BP-6089.

 48. An expression plasmid comprising the nucleic acid molecule of claim 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, or 47.

49. A host cell comprising the expression plasmid of claim 48.

50. A process for producing a recombinant protein, comprising culturing the host cell of claim 49 under conditions sufficient for the production of said protein and recovering said protein.

51. An isolated nucleic acid molecule comprising a polynucleotide having a sequence of 27 or more contiguous nucleotides of SEQ ID NO:1, 4, or 10 with the exception of a nucleic acid molecule which consists of a polynucleotide having a sequence of 27 or more contiguous nucleotides disclosed in GenBank Accession No:T09073 or GenBank Accession No:R54387.

52. An isolated nucleic acid molecule that is complementary to the nucleic acid molecule of claim 51.

53. A method for detection of a target nucleic acid molecule that encodes a protein comprising a polypeptide having the amino acid sequence of SEQ ID NO:3, 6, or 11 in a sample containing nucleic acids, the method comprising the steps of:

(a) contacting the nucleic acids with a probe nucleic acid molecule comprising a nucleotide sequence complementary to that of SEQ ID NO:1, 4, or 10 under conditions suitable for hybridization to said target nucleic acids, and

(b) detecting a hybridization product.